Fermi Research Alliance, LLC
Earned Value Management System
Annual Surveillance Review Plan

19-Feb-2016

Earned Value Management System (EVMS) Surveillance Plan Overview

The Fermi Research Alliance, LLC (FRA) EVMS was certified by the DOE Office of Engineering and Construction Management (OECM) in January 2010. FRA management maintains an effective and efficient EVMS system though surveillances, which includes an annual assessment of compliance with the FRA EVMS requirements. FRA continuously improves its EVMS processes by examining the most current techniques and processes to manage projects. The FRA EVMS Surveillance and Maintenance procedure (12.PM-008) establishes the methodology for FRA EVMS surveillances. This specific Surveillance Plan summarizes the approach to be used to complete the surveillance of the certified FRA EVMS.

1. SURVEILLANCE OVERVIEW

A Surveillance is defined as the process of reviewing the implementation of the EVMS process on one or more programs or projects. The purpose of an EVMS surveillance is to ensure the effectiveness of the EVMS to monitor and manage cost, schedule, and technical performance for FRA and its customers. An effective surveillance process provides an assessment of the current implemtation as well as encourages continuous improvement of the FRA EVMS process for use in current and future projects.

2. OBJECTIVES OF REVIEW

Maintaining an EVMS is a requirement within the DOE FRA contract, (DE-AC02-07CH11359). The specific goals of the annual FRA EVMS surveillance is to confirm that the FRA processes and procedures continue to satisfy the guidelines in the American National Standards Institute/Electronic Industry Alliance's (ANSI/EIA) 748-B Standard for Earned Value Management Systems as well as to ensure that FRA EVMS processes and procedures are being implemented appropriately.

An overview of the surveillance process includes a review of each of the ANSI guideline categories:

1 Organization
2 Planning, Scheduling, and Budgeting
3 Accounting Considerations
4 Analysis and Management Reports
5 Revisions and Data Maintenance

3. SCOPE OF REVIEW

The surveillance review scope is limited to the review of the FRA EVMS System Description (SD) and procedures as they pertain to ANSI Standard 748-B. The surveillance is not a review of the status or performance of the individual projects included in the review, because project status and performance issues are addressed separately by other reviews. This review focuses on two projects: 1. The muon-to-electron (Mu2e) conversion experiment and the Muon g-2 project. Both of these projects have been officially baselined and are required to comply with EVMS criteria for surveillance on the FRA certified system. This review will also include a status update from the Long Baseline Neutrino Facility/Deep Underground Neutrino Experiment (LBNF/DUNE) project.

The LBNF/DUNE project is requesting a CD-3a approval from DOE for Initial Far Site Construction, and a DOE CD-3a review occurred in December 2015. The authorization amount being sought is approximately $300M, whose scope includes portions of the conventional facilities (CF) to be designed and constructed on the surface, in the shafts, and underground at the Sanford Underground Research Facility (SURF) to support the LBNF cryostats and cryogenic systems and the Deep Underground Neutrino Experiment (DUNE) Far Detector. The CD-3a scope covers the initial construction work prior to baselining the LBNF/DUNE Project necessary to support installation of cryostats and cryogenic systems to be ready for installation of two DUNE detectors. Construction approval (CD-3a) essentially baselines the associated scope. The LBNF/DUNE project plans to implement the Fermi Research Alliance Earned Value Management System (EVMS) on the CD-3a scope. LBNF/DUNE presented the plan to implement EVMS at the December 2015 CD-3a review, and will provide a progress update at the EVMS surveillance review.

4. SURVEILLANCE MEMBERSHIP

Surveillance membership for this review consists of participants from other labs to ensure independence of the surveillance process. Individuals participating in the surveillance review include the following:

FRA EVMS Representative

Richard Marcum – Fermilab National Accelerator Laboratory Project Controls Manager, Office of Project Support Services (OPSS)

Surveillance Team Reviewers

Bob Wunderlich (team lead) – Consultant (DOE Retired)

Kurt Fisher – DOE-SC Office of Project Assessment

Greg Capps – Oak Ridge National Laboratory, Project Management Officer

Cathy Lavelle – Brookhaven National Laboratory, Project Management Center Manager

Jenn O'Connor – Brookhaven National Laboratory, Advanced Project Management Specialist

Betsy O'Connor – Argonne National Laboratory, OPM Financial Manager

Lynda Gauthier – Facility for Rare Isotope Beams, Michigan State University, Project Controls Manager

Leonard Mucciaro – Consultant (former DOE)

Julia Chaffin – SLAC National Accelerator Laboratory, Project Management Support Group Lead

Rick Larson – Lawrence Berkeley National Laboratory, Project Controls

Observers

Robert Franklin – Oak Ridge National Laboratory

Giorgio Apollinari – Fermilab, HL-LHC Accelerator Upgrade, Project Manager

Ruben Carcagno – Fermilab HL-LHC Accelerator Upgrade, Project Engineer

Ethan Merrill - DOE-SC Office of Project Assessment

Vivian O'Dell – Fermilab US-CMS HL-LHC Upgrade, Project Manager

Suzanne Saxer – Fermilab SLI-IERC, Project Controls

EVMS Surveillance Team Assignments

Team Member	Responsible Area	Guidelines
Kurt Fisher	Organization	1-3,5
Greg Capps Cathy Lavelle Jenn O'Connor	Planning, Scheduling, and Budgeting	6-12,14,15
Betsy O'Connor	Accounting Considerations	4,13,16-21
Lynda Gauthier Rick Larson	Analysis and Management Reports	22-27
Julia Chaffin Lenny Mucciaro	Revisions and Data Maintenance	28-31

5. PROCESS AND GUIDELINE SELECTION

All aspects of the FRA EVMS will be considered during this comprehensive system surveillance. The surveillance will address the full content of the FRA EVMS SD and will also consider the results of other DOE related reviews, as appropriate.

As discussed above, this FRA EVMS surveillance will be based upon the remaining work and content that is specific to the Muon g-2 and Mu2e projects being reviewed. The selection of EVMS guidelines and processes to be reviewed will be relevant to the projects' phases.

This surveillance is organized to provide a structured setting to assess the Muon g-2 and Mu2e projects' approach to the FRA EVMS process implementation and their consistent use across the projects' Control Account Managers (CAMs). This is facilitated by:

- A clear code of conduct;
- Understanding of how results will be used;
- Including contractor and customer project office personnel as observers on the surveillance team;
- Obtaining out-briefings and discussions of potential Corrective Actions and Continuous Improvements before a report is generated;
- A clearly defined format for reporting Corrective Actions and Continuous Improvements.

6. CODE OF CONDUCT

Responsibilities

The surveillance team will provide adequate advanced notification of specific control accounts and processes that will be reviewed based on data that will be provided by the project team prior to the initiation of the on-site surveillance. It is the intent of this surveillance to minimize any impacts with on-going project work to the extent possible. The surveillance team will not require extensive presentations or preparations, but rather focus on the review and interpretation of data provided in the selected projects' native formats. The review will be conducted in a professional manner and in a spirit of constructive assessment and discovery. The surveillance team leader is solely responsible for the final determination of Corrective Actions and Continuous Improvements and ensuring that the results are communicated to the project and Laboratory management.

Project personnel should be prepared to demonstrate through objective project information that they are complying with applicable FRA EVMS policies and procedures. The project team members should coordinate with the surveillance team to ensure that CAMs responsible for areas of specific interest are available while minimizing the impact on ongoing project activities. The project personnel should also ensure that adequate data and project policies are available to the surveillance team sufficiently in advance of the review to allow for meaningful analysis. For this review, "sufficient data" is defined as three consecutive months of recent project data provided at least two weeks prior to review. In this case, the three most recent and available months are November and December 2015, and January 2016.

The surveillance team leader will ensure that the review focuses on system compliance rather than non-system-related issues or project specific performance issues. Additionally, the surveillance team leader will make certain corrective actions identified during any previous review were addressed appropriately.

Observer Participation

Observers are guests approved by the team leader to accompany the team, and observe the review process to ensure that the system under review is compliant. The non-DOE Observers may be assigned to assist team member(s) with their assigned responsible area. The purpose of having non-DOE observers participate in this process is for them to learn what the requirements are for a compliant EVMS and how surveillances are performed to validate that compliance. This experience is to enhance their EVMS knowledge and to aid them with their current and future job responsibilities.

Project Information

Successful surveillance is predicated upon demonstration of compliance with the FRA EVMS System Description and procedures through explanations and illustrations using objective project information consisting of documents, computer files, working papers, notes, or other forms of data and communication which demonstrate compliance/non-compliance with a policy, procedure, or process. Objective project information is created in the normal conduct of business and is not prepared solely for the review of a surveillance team. The surveillance team will be located in a central location that facilitates access to project information within the Laboratory. Examples of objective project information include work authorizations, critical decision documentation, cost and schedule status databases, variance analysis reports, and estimate-to-complete rationale. A complete list of required documents will be provided to the project team prior to the review date but additional documents may be requested during or prior to the actual review. It is the intent that required documents will be available via web access to the surveillance team at least two weeks prior to the review.

Orientation

An orientation will be included at the start of the on-site EVMS review to introduce members of the surveillance and project teams and to discuss key EVMS-related forms and procedures. The surveillance team will use the orientation period to explain the goals and scope of the review, the code of conduct, the disposition of Corrective Actions/Continuous Improvement, and the resolution process.

A brief overview of the nature of the selected projects will be provided by FRA to the surveillance team to ensure they understand the goals of the projects, unique language usage, and any unusual organizational relationships.

Data Gathering

The surveillance review will be conducted both through interviewing FRA management, CAMs, and project staff and by verifying the integrity of objective project information. The initial number and scope of interviews will be defined after the project team has provided a dollarized Responsibility Assignment Matrix (RAM), with the intent that it be provided no later than three weeks prior to the review date. At least two weeks prior to the review, the surveillance team

will provide a list of CAM and project staff interviews to the project teams. The surveillance team request is to be a balance between obtaining sufficient data, meeting the time limitations for the review, and minimizing the impacts to ongoing project activities. The project teams will coordinate the scheduling of these interviews and provide an agenda to the surveillance team prior to the on-site review. Based on surveillance results, additional interviews may be conducted.

Interviews will generally be conducted in a location close to the CAM's office, which will facilitate ease of access to objective project information. During each interview, the surveillance team will assess the level of understanding and compliance with FRA EVM policies, procedures, and processes, while monitoring local practices to assess how well they comply with the intent of the EVM guidelines. The surveillance review will be thorough and structured. This involves developing a list of subject areas to facilitate scheduled interviews, ensuring that discussions address the complete EVMS process.

CAM interviews are a key component of EVMS surveillance because CAMs are the source of much of the EVMS information. CAM interviews are supplemented with data integrity tests performed independently. The ultimate objective is to determine the CAMs' use of the information derived from the EVMS as an effective management tool. All interviews will incorporate the common attributes based on the National Defense Industrial Association (NDIA) Program Management Systems Committee (PMSC) Intent Guide, May 2011 edition. The purpose of the interview is to assess the CAMs' understanding and implementation of the following subjects:

1. Organization
    a. Verify that the Work Breakdown Structure (WBS) contains (Guideline 1 Intent Guide)
        i. All project work, including revisions for authorized changes.
        ii. All contract line items and end items.
        iii. All external reporting elements.
        iv. Elements extended to the control account level.
        v. Maps to the WBS dictionary.
    b. Verify that a Work Authorization with scope, schedule, and budget exists at control account level (Guideline 2 Intent Guide). Verify that external Work Authorization with the identified Customer exists, at least, at the project level.
    c. Verify that the Organizational Breakdown Structure (OBS) is documented (Guideline 3 Intent Guide).
    d. Verify that the same WBS is linked between schedules, work authorization, and control account plans (Guideline 3 Intent Guide).
    e. Verify that the there is a documented process and organizations established to specifically manage and control indirect costs (Guideline 4 Intent Guide).
    f. Verify that Responsibility Assignment Matrix or equivalent documents control accounts at appropriate level (Guideline 3 & 5 Intent Guide).

2. Planning, Scheduling and Budgeting

a. Ensure Project Schedule specifics (Guideline 6 Intent Guide)
    i. WBS/OBS identifiers exist in the project schedule at activity level for summarization.
    ii. Project schedule reflects entire WBS Dictionary.
    iii. Critical target/contractual dates are identified in the project schedule.
    iv. The project schedule identifies significant interdependencies.
    v. Task durations are meaningful and relatively short.
    vi. Longer tasks use objective earned value techniques.
    vii. Resource estimates are reasonable and consistent with the schedule.
    viii. The baseline is reasonable to achieve project requirements as demonstrated through schedule analysis techniques.
    ix. The project schedule baseline is established.
    x. The schedule provides current status and forecasts of completion dates for all discrete work.
    xi. The project has a critical path.
b. Verify that objective completion criteria are used as basis to determine achievement (Guideline 7 Intent Guide).
c. Verify that CAM updates schedule status (Guideline 7 Intent Guide).
d. Verify that the integration of scope, schedule and budget at the control account level (Guideline 8/9 Intent Guide).
e. Verify that the time-phased Performance Measurement Baseline (PMB) equals the work authorization and summarizes above the control account to the contract value (Guideline 8/9 Intent Guide).
f. Verify that control account budgets identify elements of cost including subcontractor (Guideline 9 Intent Guide).
g. Verify that management reserve and undistributed budget, if any, track to logs (Guideline 9/14 Intent Guide).
h. Verify that schedule and cost variances are collected at control accounts (Guideline 10 Intent Guide).
i. Verify the work packages are uniquely identified, have a budget, and have an earned value technique (Guideline 10 Intent Guide).
j. Verify that planning packages are not in the current month and reflect the manner in which the work will be performed (Guideline 10 Intent Guide).
k. Verify that the control account work packages and planning packages (if any) add to the control account total budget (Guideline 11 Intent Guide).
l. Identify level of effort designated work is appropriately categorized and identifiable (Guideline 12 Intent Guide).
m. Verify there is a documented process for managing indirect costs with an organizational structure identifying ownership, responsibility, authority levels, and distribution of indirect costs reflected in the program budgets at the appropriate level. (Guideline 13 Intent Guide). .
n. Verify that management reserve and undistributed budget logs reconcile with last two months of Cost Performance Reports (CPR) (Guideline 14 Intent Guide).
o. Verify that baseline control logs reconcile with performance measurement baseline (Guideline 15 Intent Guide).

3. Accounting Considerations
    a. Verify that Actual Cost of Work Performed (ACWP) in the CPR reconcile with books of record (Guideline 16 Intent Guide).
    b. Verify that WBS and OBS summarize direct costs from one control account (Guideline 17/18 Intent Guide).
    c. Verify that indirect costs are applied to the direct costs per Laboratory Policy (Guideline 19 Intent Guide).
    d. Verify that unit cost are identified when needed (Guideline 20 Intent Guide).
    e. Verify that effective performance measurement is assessed on material no earlier than point of receipt and consistent with the method budgeted (Guideline 21 Intent Guide).
    f. Verify that an established process exists for reporting subcontractor costs and material actual costs (Guideline 21 Intent Guide).

4. Analysis and Management Reports
    a. Verify that variance analysis is performed to the project thresholds as required (Guideline 22 Intent Guide).
    b. Verify that variance analysis contains cause, impacts, and corrective action as appropriate (Guideline 22/23 Intent Guide).
    c. Verify that corrective actions are assessed and closed in a timely manner (Guideline 23/26 Intent Guide).
    d. Identify budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, along with the reasons for any significant variances (Guideline 24 Intent Guide).
    e. Verify that variance analysis as reported to the customer reconciles with the analysis at the control account level (Guideline 25 Intent Guide).
    f. Verify Estimate to Complete (ETC)/Estimate at Complete (EAC) (Guideline 26 Intent Guide)
        i. Verify that Comprehensive EACs are updated per requirements and take into account efficiencies.
        ii. Verify that CAMs review achievability of control account EAC monthly.
        iii. Verify that time-phased ETC reconciles with the EAC as reported externally.
        iv. Verify that risks and opportunities are integrated into summary schedule and ETC resource plans.

5. Revisions and Data Maintenance
    a. Verify that work authorization plus any baseline change documentation equal current control account budget (Guideline 28/29 Intent Guide).
    b. Trace last change proposal authorized. Verify schedule and cost integration at control account level and that the WBS is updated as appropriate (Guideline 28/29 Intent Guide).
    c. Verify that change logs reconcile and contain justification (Guideline 28/29 Intent Guide).

d. Verify that retroactive changes are made only for correction of errors, accounting adjustments, effects of customer management directed changes to improve accuracy of data. If any have been made, verify that they are consistent with disclosed EVMS policy (Guideline 30 Intent Guide).
e. Verify, in at least one control account, that last month's changes as reported to the customer and this month's PMB reconcile to entries in the contractual baseline log (Guideline 30 Intent Guide).
f. Verify that negative earned value status, if any, has been adequately explained (Guideline 31/32 Intent Guide).
g. Verify that all baseline changes within a month reconcile to baseline control requests or the equivalent (Guideline 31/32 Intent Guide).

Additional interviewees may include the project manager, the project controls manager, and line management.

7. SURVEILLANCE RESULTS

Concerns Identified During the Surveillance

The surveillance team will gather data through reviewing documentation and conducting interviews. A key component of the surveillance is communicating timely, pertinent, and candid feedback. Surveillance team members and project personnel should seek clarification to fully understand questions asked, the data sought, and the responses provided. If, after fully understanding the information provided, a surveillance team member believes that there may be a question of compliance; the surveillance team will discuss the observation. If the surveillance team determines that the observation is still a question of compliance; the FRA project lead representative and pertinent members will be notified by the surveillance team of the concern no later than during the out-brief discussions at the end of each day. This gives the project the opportunity to supply the surveillance team additional information to clarify the observation. This may result in the "concern of the observation" being resolved, or may result in a recommendation for Continuous Improvement, or an observation of non-compliance requiring Corrective Actions. Corrective Actions/Continuous Improvement are defined as:

> *Corrective Actions* - Corrective Actions fall into two broad categories: 1) non-compliance with the accepted EVMS description or procedures and 2) non-compliance with the ANSI/EIA 748B EVMS guidelines. Failure to resolve Corrective Actions reduces confidence in the ability of project management to effectively use the EVMS process to achieve project goals and objectives of the stakeholders. A Corrective Action Plan is required for each finding.
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> *Continuous Improvements* - The team members may recommend EVM implementation enhancements such as sharing of successful practices, tools, or other items that come to their attention. Continuous Improvements, however, are not the same as Corrective Actions and, therefore, need not be tracked for closure. However, should a recommendation have an asterisk (*), the team members have elected that this practice is critical enough to require tracking to closure.

Surveillance Final Out-Brief

The surveillance team will evaluate what they have observed and the information received during the interviews from the project team and come to a consensus if any Corrective Actions/Continuous Improvement items should be issued. Also, the surveillance team should identify if the observations are systemic rather than isolated issues. Any Corrective Actions/Continuous Improvement items are to be presented by the surveillance team to the project team at the Final Out-Brief.

It is possible that the project teams may disagree with the final surveillance results. When a finding is not due to a team's misunderstanding, the FRA EVMS Representative must be able to explain the impact of deviating from FRA policy and the benefits to the project and management team of non-compliance with the intent of the EVMS guidelines.

Final Report

The surveillance team will develop a preliminary report and give the FRA EVMS Representative the opportunity to provide any additional feedback in a reasonable timeframe. The surveillance team will take into consideration any feedback received when developing the final report. The final report will be issued by the surveillance team leader to the FRA EVMS Representative (head of OPSS), and the Chief Project Officer (CPO). Dates for report delivery will be agreed to at the Final Out-brief.

Corrective Action Plan

The FRA EVMS Representative will develop a Corrective Action Plan (CAP) to address any Corrective Actions or Continuous Improvements identified in the Final Report from the surveillance team. The CAP should include a schedule with realistic dates for when the corrective actions are to be completed. The project personnel will provide input regarding corrective actions, including estimated completion dates. The surveillance team will receive a copy of the CAP for information only; unless it is determined at the Final Out-brief that further actions are required by the surveillance team – such as a follow-on review.

Corrective Action Plan Processing and Tracking

Problem areas identified during the assessment that are determined to be non-compliant with management system requirements or the organization's implementing requirements will be reported as Corrective Actions , documented on Corrective Action Plans (CAPs), and processed in accordance with the Fermilab Corrective & Preventive Action Procedure, 1004.1001.

Surveillance Review Close-out

The FRA EVMS Representative is to ensure that CAP has been acceptably completed. The close-out of the CAP and any follow-up verification performed should be documented and retained for future EVMS surveillances.

Table of Revisions

Author	Description	Revision	Date
M. Kaducak	Initial Draft	Draft V0	10/12/2015
M. Kaducak	Included review committee membership	Draft V1	2/8/2016
M. Kaducak	Updated Observer list	V2 (published)	2/19/2016